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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/960,449
Filing Date: September 21, 2001
Appellant(s): HOLLAND ET AL.

COLLEN A. BEARD
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 10, 2007 appealing from the Office action mailed June 13, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 6,007,833	Chudzik et al.	12-1999
US 6,179,862	Sawhney	01-2001

(9) Grounds of Rejection

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The following ground(s) of rejection are applicable to the appealed claims:

(i) Claims 1-4, 8-11, 13-17, 21-23, 25 and 27-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The recitation of "the initiator not bound to another polymer" has introduced new matter situation that was not described in the specification as originally filed. Nowhere in the specification have applicants disclosed initiator not bound to another polymer or even disclosed any polymer other than the macromer in the hydrogel.

(ii) Claims 1, 2, 8, 9 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,007,833 (833).

The scope of claims 1 and 29 is product by process, wherein the product is liquid composition comprising water soluble PVA having one or more pendant crosslinkable acrylamide groups. The intended use of the composition for spray delivery is not given weight in a claim directed to a composition.

US '833 teaches a hydrogel wound dressing that is applied to the wound site as a liquid composition and forms flexible polymeric matrix upon exposure to light, i.e. hydrogel formed *in situ* (col.10, lines 1-6). The hydrogel composition comprising crosslinkable macromer includes two or more polymer pendant polymerizable group (abstract). The macromer includes water-soluble polymer, i.e. degradable, as polyvinyl alcohol; and acrylamide as a pendant polymerizable group (col.5, lines 25-30, 47-53). Acrylamide groups contain olefinically unsaturated groups. The hydrogel comprises therapeutic agent including growth factor, antimicrobial agent and antithrombotic agent (col.10, lines 11-12, 35-37). On col. 15, lines 28-31 of US '833, the reference teaches that the initiator can be polymer-bound or non-polymer bound solution.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a hydrogel composition comprising crosslinkable PVA macromer having one or more polymer pendant polymerizable group of acrylamide as disclosed by US '833

(iii) Claims 3, 4, 10, 11, 13-17, 21-23 25, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,007,833 ('833) in view of US 6,179,862 ('682).

US'833 teaches a hydrogel wound dressing that is applied to the wound site as a liquid composition and forms flexible polymeric matrix upon exposure to light, i.e. hydrogel formed *in situ* (col.10, lines 1-6). The hydrogel composition comprising crosslinkable macromer includes two or more polymer pendant polymerizable group (abstract). The macromer includes water-soluble polymer, i.e. degradable, as polyvinyl alcohol; and acrylamide as a pendant polymerizable group (col.5, lines 25-30, 47-53). Acrylamide groups contain olefinically unsaturated groups. The hydrogel comprises therapeutic agent including growth factor and antimicrobial agent (col.10, lines 11-12). On col. 15, lines 28-31 of US '833, the reference teaches that the initiator can be polymer-bound or non-polymer bound solution.

US '833 does not teach the composition is delivered by spray as claimed in claims 3, 4, 14-17, 21-22. The reference does not teach the active agent as NO as claimed in claims 10 and 23, or the redox irradiation as claimed in claims 13 and 25. The reference does not teach the dressing debrides the wound when removed as claimed in claim 12.

However, US '833 teaches the liquid delivery of the composition without excluding or specifying any method of delivery, thus spraying the liquid composition into the wound is inclusive in the reference teaching. The reference also teaches the delivery of antithrombotic drugs at the site of application, and this is inclusive to NO, and one having ordinary skill in the art would have determined the antithrombotic agent to

use according to the specific patient condition. The reference further teaches the UV irradiation to initiate polymerization. The reference disclosed that the wound dressing formed is very well adheres to the wound site, and it is expected upon its removal to debride the wound.

US '862 disclosed method and composition for forming *in situ* tissue adherent barrier using sprayer to apply cross-linkable two components to the tissue that enable to form coating on the tissue surface (abstract; col.1, lines 48-51, 65-67; col.2, lines 1-8). When the sprayer is activated, the emergent spray contacts tissue, resulting in mixing and cross-linking of the components to form coating, e.g. hydrogel, on the tissue surface (col.2, lines 5-9). The components are in the form of solution and comprise water-soluble, crosslinkable, biodegradable macromers (col.2, lines 19-34; col.7, lines 24-30). The hydrogel formation is initiated by redox irradiation to form coating (col.4, lines 24-27; col.6, lines 3-5).

Thus, it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a hydrogel composition comprising crosslinkable PVA macromer includes one or more polymer pendant polymerizable group of acrylamide as disclosed by US '833 and deliver the composition by spraying and use redox for crosslinking as disclosed by US '862, motivated by the teaching of US '862 that the spraying on the tissue surface followed by redox irradiation enable to form a wound coating, with reasonable expectation of having a hydrogel composition comprising crosslinkable macromer includes one or more polymer pendant polymerizable group

that is delivered from sprayer and polymerized by redox irradiation that enables to protect the wound and initiate wound healing with success.

(10) Response to Argument

(i) Appellants argue that claims 1-4, 8-11, 13-17, 21-23, 25, and 27-29 comply with the written description requirement

Appellant's arguments filed 10/10/2007 have been fully considered but they are not persuasive. Appellants argue that claim read as "initiator not bound to a macromer or another polymer" meaning that the initiator is not bound to the macromer or any polymer other than the macromer. The macromers are polymers as defined by applicants. Thus the phrase "another polymer" refers to the macromer, not a second polymer taught in the specification. The claims at issue are drawn to the use of an unbound initiator, and the specification clearly enables unbound initiator. Example 13 shows that the initiator is not bound, to the macromer itself, or to another polymer. On page 9, a redox couple initiator is discussed wherein one solution contains a reducing agent such as a ferrous salt and another solution contains an oxidizing agent such as hydrogen peroxide and none of them is bound to a macromer or other polymer. Nowhere in the specification is a bound initiator discussed at all. The Applicants do not have to delineate each and every unbound initiator that can be used. Nor does the specification need to have a specific statement that the initiators are unbound to satisfy this requirement.

In response to this argument, it is argued that even the specification does not teach that the initiator is bound to the backbone of PVA macromer, but it does not also teach that the initiators is not linked to another polymer that can be found in the composition, neither disclosed what are those another polymer. It is further argued that the claims recite that the initiator is not bound to “a macromer or another polymer”, and this recitation is not referring to the PVA macromer recited by the claims, but referring to another macromer and another polymer. The specification disclosed only some specific initiators are not bound to the backbone of the PVA macromer, and not all initiators encompassed by the claims, and does not disclose what are “a macromer or another polymers”, other than the PVA macromer that initiators are not bound to. “Unbound initiators” represents a huge genus which is not properly represented by a couple of inorganic initiators in the examples. The specification does not describe the genus of "unbound initiators”. The present claims encompass initiator not bond to the macromer or unable to bound to any macromer or other polymer. Nowhere applicants have disclosed such initiator. The disclosure is not commensurate with the scope of protection sought by the claims. It is the examiner’s duty to determine exactly what subject matter is encompassed by the claims. See, *AK Steel Corp. v. Sollac*, 344 F.3d 1234, 1244, 68 USPQ2d 1280, 1287 (Fed. Cir. 2003).

(ii) Appellants argue that claims 1, 2, 8, 9, and 29 are not obvious in view of the '833 patent

Appellant's arguments filed 10/10/2007 have been fully considered but they are not persuasive.

The '833 patent does not teach or suggest unbound initiator

Appellants argue that '833 patent teaches a crosslinkable macromer system that can be used as a wound dressing. The system includes two or more polymerizable groups that are attached to a macromer or polymer and one or more initiator groups that are attached to a macromer or polymer. US '833 patent specifically teaches that free initiators should be avoided as they can present toxicity, efficacy, and solubility (see col. 2, lines I5-20). To this effect, the initiators are bound to the backbone of either the polymer or macromer. Example 12 of US '833 is comparing polymer bound initiator with non-polymer-bound initiator and finds that the non-polymer-bound initiator is NOT AS GOOD. Therefore, US '833 teaches away from the unbound initiator of the present invention.

In response to this argument, appellants' attention is directed to the scope of the present claim 1 that is directed to a composition, and the elements of the composition are disclosed by US '833, because after polymerization of the present hydrogel in situ the initiator is bounded to the macromer/polymer. The final product of the present claims in obvious over the hydrogel disclosed by US '833, which is crosslinked macromer comprising PVA having pendant acrylamide unites and initiator, all crosslinked together. Regarding the claims directed to method of making the hydrogel, the method requires only one step of applying the hydrogel composition comprising the macromer and the

initiator to the wound to polymerize in situ, and this step is also taught by the reference at col.10, lines 1-6, to provide in situ polymerizable wound healing hydrogel, as desired by the instant claims. Therefore, the instantly claimed hydrogel is not distinct from the prior art hydrogel produced by composition comprising initiator bound to the macromer. Additionally, in the background section of the reference, it showed that unbound initiators are known in the art. The reference disclosed the initiator group is present as either a pendent group on a polymerizable macromer, or pendent on separate, non-polymerizable polymer backbone, i.e. not bound to the macromer (co1.4, lines 50-53). On col. 15, lines 28-31 of US '833, the reference teaches that the initiator can be polymer-bound or non-polymer bound solution. The reference further disclosed that the initiator can be bound to the polymeric backbone, and the expression "can be" indicates that the initiator also can not be bound to the polymer backbone. Again, non-bound initiators were known in the art at the time of the invention. The disclosed examples and preferred embodiment do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). In considering the disclosure of the reference, it is proper to take into account not only the specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). The reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve different problem. It is not necessary that the prior art suggest the combination or

modification to achieve the same advantage or result discovered by applicant. *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972).

In response to appellant's argument that the reference teaches the unbound initiators presents toxicity, it is noted that such a feature is not recited in the rejected claim(s) and never been one of appellants' concerns throughout their disclosure. The problem applicants are concerned with is wound healing, and this problem is addressed by the composition of the prior art.

The '833 patent does not teach or suggest spray delivery

Appellant further argue that the '833 patent does not teach a wound dressing formed by spray delivery of a liquid composition. The Examiner's argued that US '833 teaches the liquid delivery of the composition without excluding or specifying any method of delivery, thus spraying the liquid composition into the wound is inclusive in the reference teaching. Appellants argue that the '833 patent teaches several methods of delivery, none of which are spray delivery, such as applying the liquid composition via a catheter, via syringe and via dip coating. A wound dressing formed by spray application of a composition offers several advantages over application of a liquid composition via syringe, catheter, or dipping, such as increase the penetration of the polymer into the wound area thereby potentially making the delivery of active ingredients more efficient. Penetration of the polymer into the wound bed may also aid in debridement of the wound during dressing changes to accelerate the wound healing

process. With spray delivery of an in situ polymerizing polymer, a thin coating can be achieved with excellent coverage of the treated area.

In response to these arguments, it is argued that claim 1 is directed to product by process wherein the product is formed by spray delivery. Product by process claims are not limited to the manipulation of the recited steps, only the structure implied by the steps. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir.1985). The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979). "The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. *In re Fessmann*, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974); *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983). Since the present composition is substantially identical to the

composition disclosed by US '833, the burden is on appellants to show an unobvious difference. The reference teaches liquid composition that forms hydrogel in situ, therefore it is applied as liquid and can be applied by any methods known to apply liquids including spray.

Regarding the method claim 14 that recites the step of applying the composition to the wound via spray, it is argued that the reference teaches liquid composition having the same ingredients as the present claims, and further teaches the composition extrudable via catheter or syringe, and this would have suggested to one having ordinary skill in the art to spray the composition to the wound because syringe when hold close to the wound and plunger is pushed to deliver the composition, it squirts the composition to the wound, which reads on spraying. The claims included in this rejection over US '833 do not recite any specific spraying method or device, therefore, the syringe or catheters disclosed by the prior art reads on spray delivery and are capable to deliver the liquid to the wound site.

Further, the present hydrogel formed by spraying is not distinguishable over the prior art hydrogel applied to the wound by syringe or catheter, and both usable for wound treating. As a practical matter, the Patent Office is not equipped to manufacture products by the processes put before it and then obtain prior art products and make physical comparisons therewith." *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

(iii) Appellants argue that claims 3, 4, 10,~11, 13-17, 21-23, 25, 27, and 28 are not obvious over the '833 patent in view of the '862 patent

The '833 patent

Appellants hereby repeat the argument regarding US '833; therefore, the examiner's response is repeated.

The '862 patent

Appellants argue that 862 patent teaches a method for forming a tissue adherent barrier in situ using a sprayer to deliver crosslinkable fluids and teaches PEG macromer, while the present claims directed to PVA macromer which is advantageous over PEG. There exists no reason to combine the teachings of the references, because the '833 patent teaches away from the invention recited in the claims because it specifically teaches using a bound initiator. Moreover, even if the references are combined, the claimed invention does not result. The combined patents do not teach a wound dressing formed by spraying a PVA macromer having one or more pendant crosslinkable groups and using an unbound initiator.

In response to these arguments, it is argued that US '862 is relied upon for the solely teaching that the macromers can be sprayed to the wound to polymerize in situ. A conclusion of obviousness under 35 U.S.C. 103 (a) does not require absolute predictability, only a reasonable expectation of success; and references are evaluated by what they suggest to one versed in the art, rather than by their specific disclosure. *In*

re Bozek, 163 USPQ 545 (CCPA 1969). US '833 as stated above teaches the initiator can be not bound to the macromer, and US '862 teaches at co1.6, lines 3-7 the same initiator system disclosed by the applicants and does not teach the initiators bound to the macromer. Further, US '862 is relied upon for teaching the initiator system and the spray delivery recited in the method claim 14. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir.1986). In considering the disclosure of the reference, it is proper to take into account not only the specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). The rational to modify or to combine the prior art does not have to be expressly stated in the prior art; the rational may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art. The reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve different problem. It is not necessary that the prior art suggest the combination or modification to achieve the same advantage or result discovered by applicant. *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972). In this case, it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a hydrogel composition comprising crosslinkable PVA macromer includes one or more polymer pendant polymerizable group of acrylamide as disclosed by US '833 and deliver the

composition by spraying and use redox for crosslinking as disclosed by US '862, motivated by the teaching of US '862 that the spraying on the tissue surface followed by redox irradiation enable to form a wound coating, with reasonable expectation of having a hydrogel composition comprising crosslinkable macromer includes one or more polymer pendant polymerizable group that is delivered from sprayer and polymerized by redox irradiation that enables to protect the wound and initiate wound healing with success.

It has been held that: "When a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious." *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740 (2007) (quoting *Sakraida v. AG Pro, Inc.,* 425 U.S. 273,282 (1976)). "When the question is whether a patent claiming the combination of elements of prior art is obvious," the relevant question is "whether the improvement is more than the predictable use of prior art elements according to their established functions."

The combined teachings of US '833 and US '862 suggests the invention as whole as recited by claims 3, 4, 10, 11, 13-17, 21-23, 25, 27 and 28.

Specific dependent claims

Claims 4 and 17

Appellants argue that neither the '833 nor the '862 patent teaches the use of a pump spray device. The devices taught in the '862 patent rely upon gas discharge.

Claims 10 and 23

Appellants argue that neither patent teaches the delivery of nitric oxide (NO) to the wound.

In response to these arguments, regarding pump spray claimed by claims 4 and 17, applicants failed to show superior and unexpected results obtained from pump spray over gas spray disclosed by US '862.

With regard to NO claimed by claims 10 and 23, US '833 teaches the delivery of antithrombotic drugs in the composition comprising macromer and delivered by spray to the wound, and this is inclusive to NO, and one having ordinary skill in the art would have determined the antithrombotic agent to use according to the specific patient condition. NO recitation does not impart patentability to the claims, absent evidence to the contrary.

In the light of the foregoing discussion, the Examiner's ultimate legal conclusion is that the subject matter defined by the claims would have been *prima facie* obvious within the meaning of 35 U.S.C. 103 (a).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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